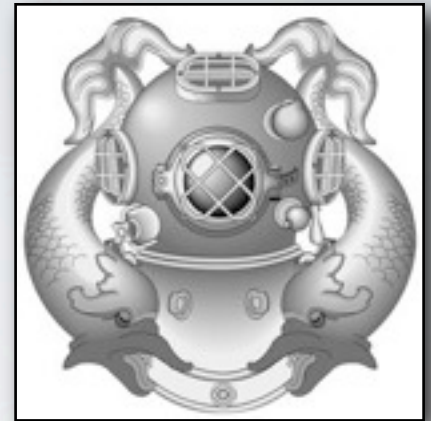


U.S. NAVY DIVING OPERATIONS



OVERVIEW



- History and Types of Navy Diving
- Diving and Ocean Engineering
- Past and Current Operations
- Recovery Expedition for the USS Monitor

HOLLYWOOD VERSION

HOLLYWOOD VERSION

MEN OF
HONOR

HISTORY

- Navy's first dive school located at Naval Torpedo Station Newport, RI
- Salvage of USS Squalus, S-51, and F-4 pushed depths to 300 FSW
- Salvage after attack on Pearl Harbor WWII
- Man in the Sea Experiments



HISTORY



HISTORY



US NAVY DIVERS



EOD / SEALs



SEAL DELIVERY VEHICLE (SDV)

SEAL DELIVERY VEHICLE (SDV)



UNDERWATER CONSTRUCTION TEAMS



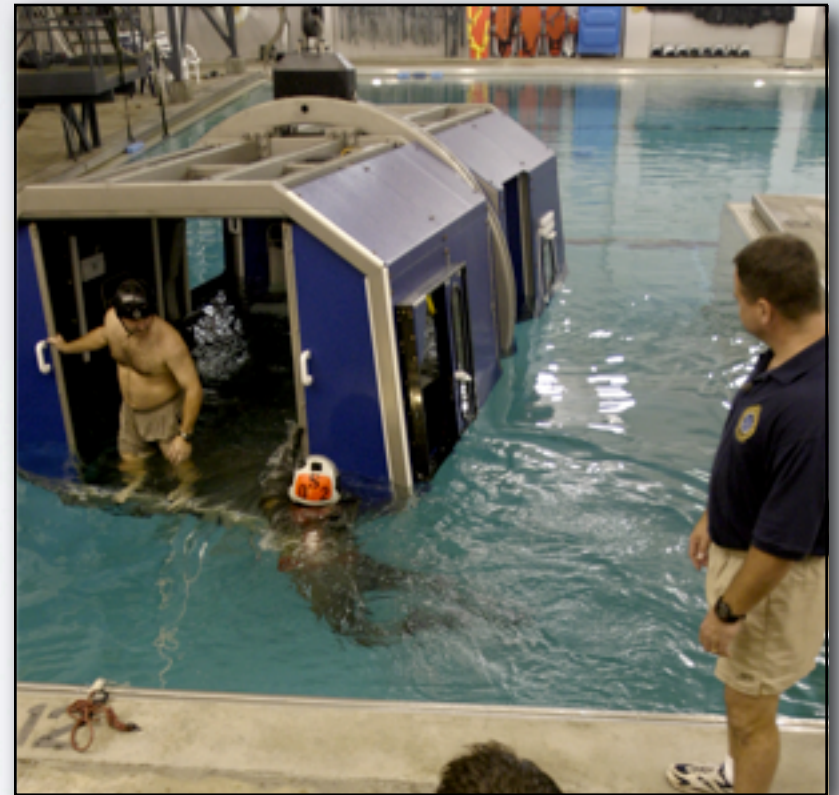
SUBMARINE RESCUE



HYPERBARIC TREATMENT



AVIATION SURVIVAL TRAINING



SHIP'S HUSBANDRY



SALVAGE



ICELAND CABLE INSTALLATION



U.S.S. COLE



THULE, GREENLAND



LA MADDALENA, ITALY

PORT CLEAN-UP

LA MADDALENA, ITALY PORT CLEAN-UP



MINNEAPOLIS BRIDGE COLLAPSE



HAITI PIER REPAIR



TWA FLIGHT 800

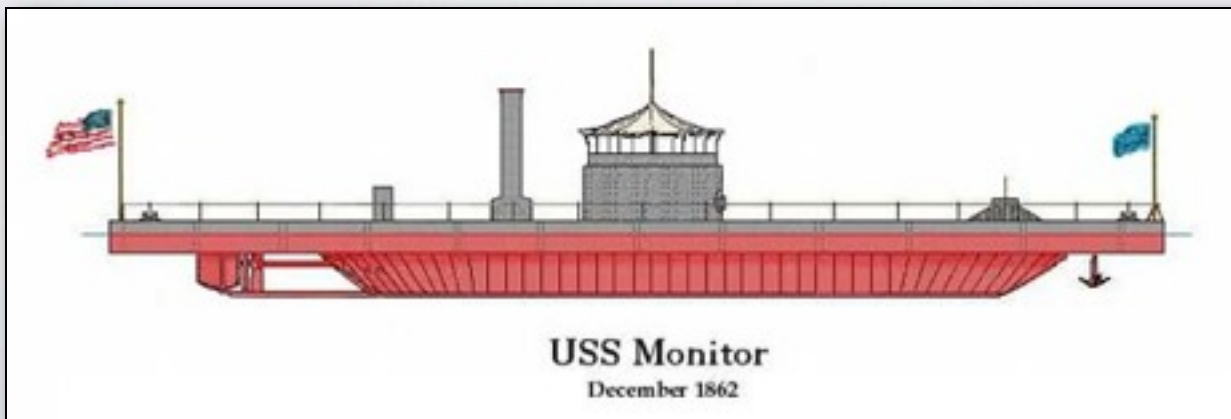


THE NAVY AND THE USS MONITOR



HISTORY LESSON

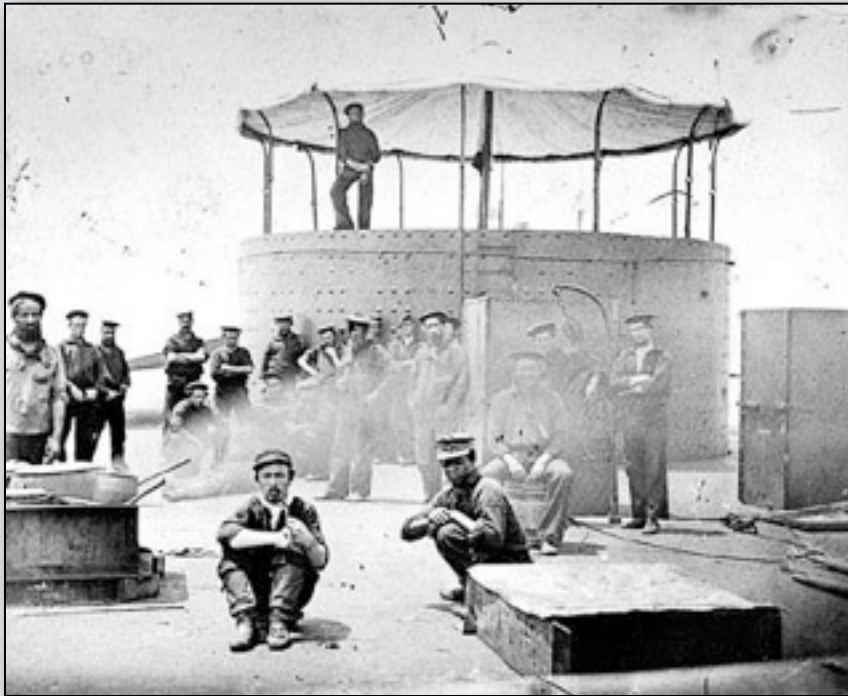
- USS Monitor was a prototype for a class of U.S. Civil War ironclad warships
- Designed by Swedish-American Engineer John Ericsson
- First to incorporate iron decking for protection



BATTLE OF THE IRONCLADS

- March 9 1862: The Monitor traveled from Cape Henry to an area off of Fort Monroe
- Met the Iron Confederate vessel, CSS Virginia (Ex USS Merrimack), for the famous battle
- Battle lasted for almost 4 hours
- First engagement between iron ships

BATTLE OF THE IRONCLADS



- After receiving and delivering enough cannon fire to sink a dozen wooden ships of sail the battle ended in a draw
- The Damage: Several dents in the hull and the turret

THE WRECK OF THE USS MONITOR

- In late December of 1862, the Monitor was ordered South to NC to rendezvous with other Union Ships
- The Monitor was towed out of the Chesapeake Bay on Dec 29th by the steam ship, Rhode Island
- First 12 hours was relatively calm, but before the start of the New Year the Monitor was in trouble

THE WRECK OF THE USS MONITOR

- As seas began to overtake the pumps, the captain of the Monitor ordered men to the lifeboats of the Rhode Island
- As the life boats returned to the Monitor for the rest of the crew, the ships lantern went out of sight
- The Monitor slipped beneath the waves in the area known as the Graveyard of the Atlantic with 16 souls still aboard

MAP OF WRECK SITE

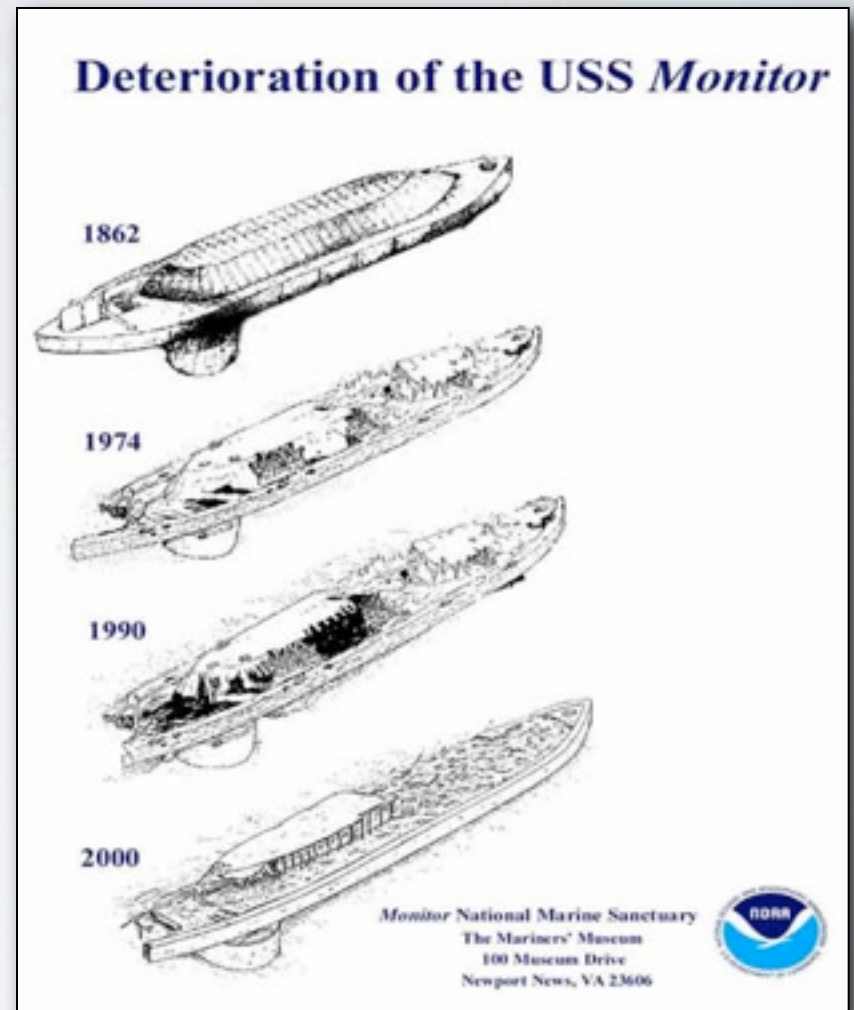


DISCOVERY

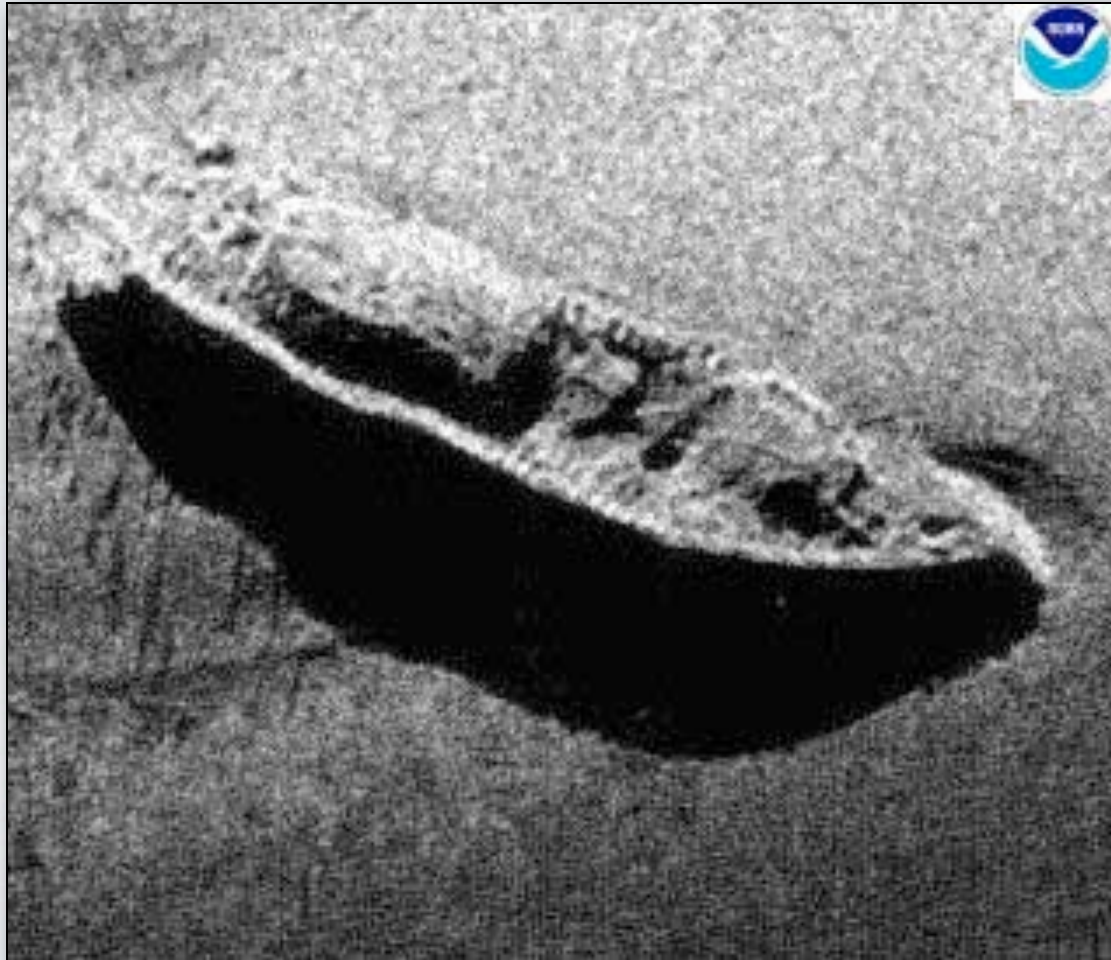
- The wreckage lay undiscovered until Aug 1973, when scientists aboard a Duke research vessel discovered the remains.
- The wreck was found in 240 feet of water, roughly 16 miles from Cape Hatteras.

DETERIORATION OF WRECK

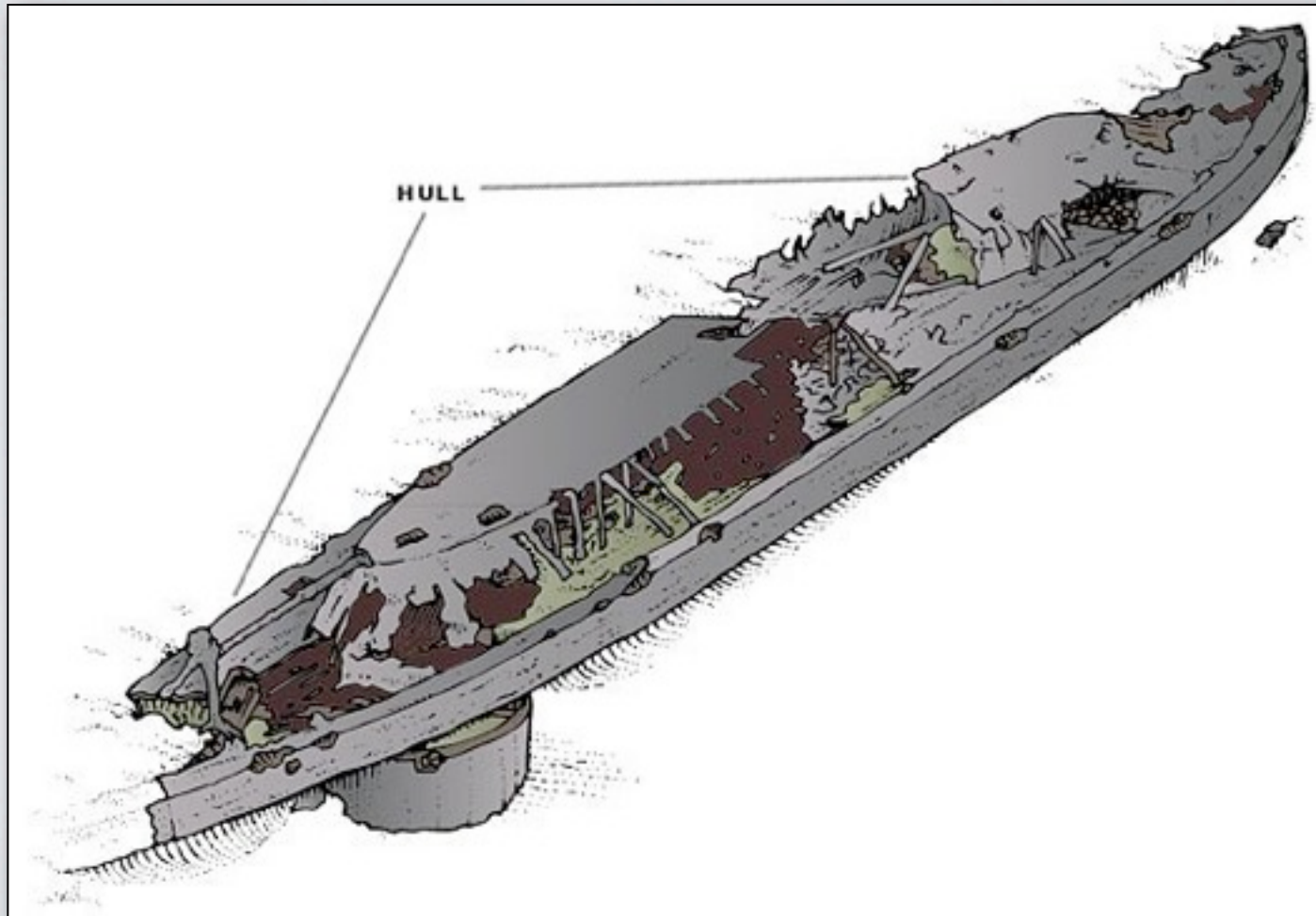
- The vessel was found lying upside down
- In addition to natural deterioration the wreck may have been damaged by depth charging during WWII



SIDE SCAN SONAR OF WRECK



WRECKAGE OF USS MONITOR



NATIONAL MARINE SANCTUARY



USS Monitor Mosaic

Monitor Collection, NOAA

RECOVERY OPERATIONS

- NOAA decided that best course of action would be the recovery of intact items before they succumb to further deterioration
- US Navy was asked to help because of it's ability to support deep water diving and salvage projects

MONITOR EXPEDITIONS

- Three summer long expeditions were conducted starting in the year 2000
- The major goal was to recover various artifacts from the wreckage
- Lead Navy Unit: Mobile Diving and Salvage Unit Two from Little Creek, VA

MAJOR EXPEDITION GOALS

2000

- Recover Skeg and Propeller Shaft
- Place Engine Recovery System

2001

- Recover Engine

2002

- Recover Gun Turret

2000 PROPELLER SHAFT RECOVERY



TURRET RECOVERY 2002



TURRET RECOVERY 2002

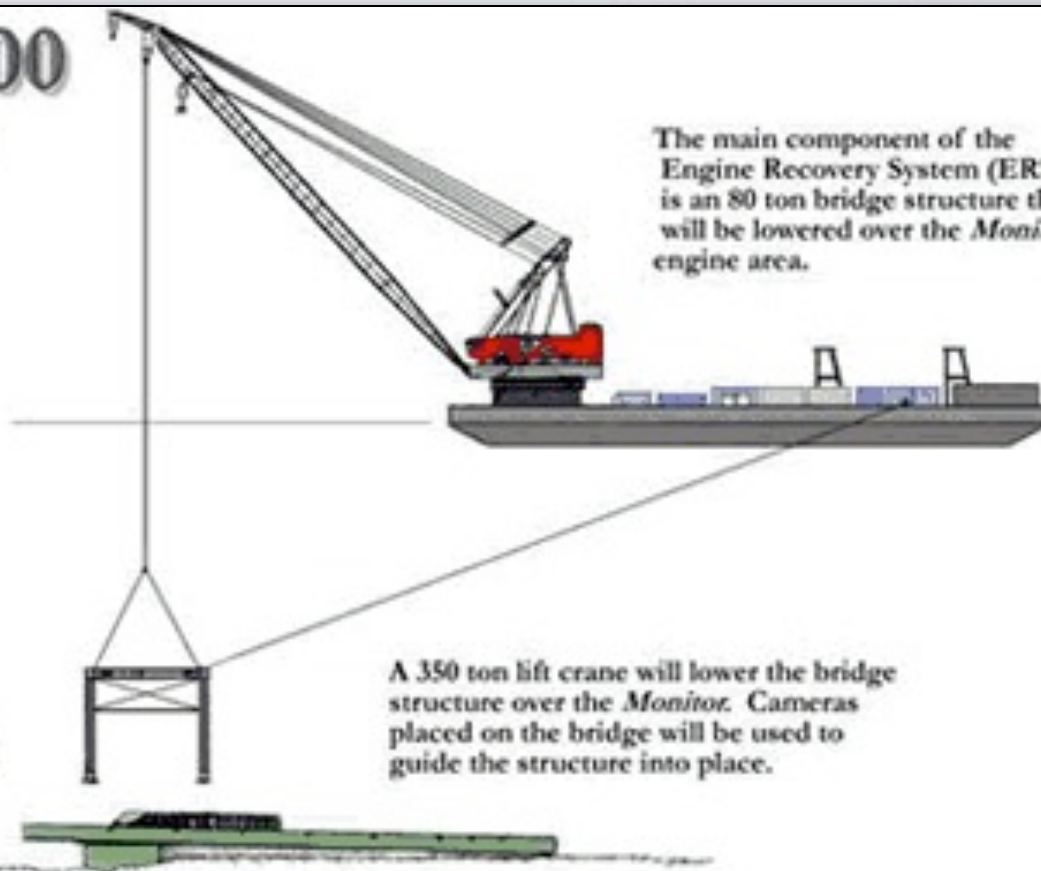


ENGINE RECOVERY SYSTEM

Monitor 2000



The Bridge in Position



The main component of the Engine Recovery System (ERS) is an 80 ton bridge structure that will be lowered over the *Monitor's* engine area.

A 350 ton lift crane will lower the bridge structure over the *Monitor*. Cameras placed on the bridge will be used to guide the structure into place.

2001 ENGINE RECOVERY



- 300 foot long barge
- 100 personnel
- 24 hour diving operations
- 300-ton derrick crane

DIVING OPERATIONS

- 412 mixed gas dives for 198 hours of bottom time
- Saturation Dives: 467 hours of bottom time and 211 man-days in saturation



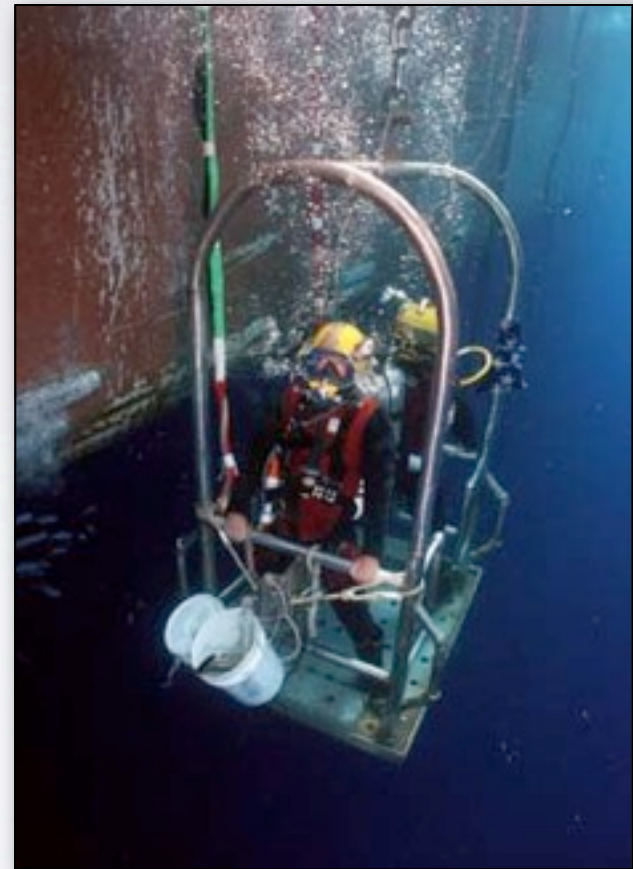
MIXED GAS DIVING



- Navy MK-21 Surface Supplied Diving Helmet
- Surface tethered with umbilical containing air, communication, video, and hot-water lines

MIXED GAS DIVING

- Helium and Oxygen breathing mixture
- Greatly reduces chance of decompression sickness
- 30-40 minutes bottom time
- 2+ hours decompression



SURFACE DECOMPRESSION



SATURATION DIVING

- During the 2001 Expedition, Navy divers utilized the Global Industries 1504 saturation system, a 12-person, two-chamber system with a two-person closed diving bell.
- The system can operate as deep as 1,500 ft
- First use of a commercial diving system

SATURATION DIVING

- Used to reduce time lost due to decompression
- 4 men live under pressure for week +
- Decompression is completed at the end of week – 66 hours

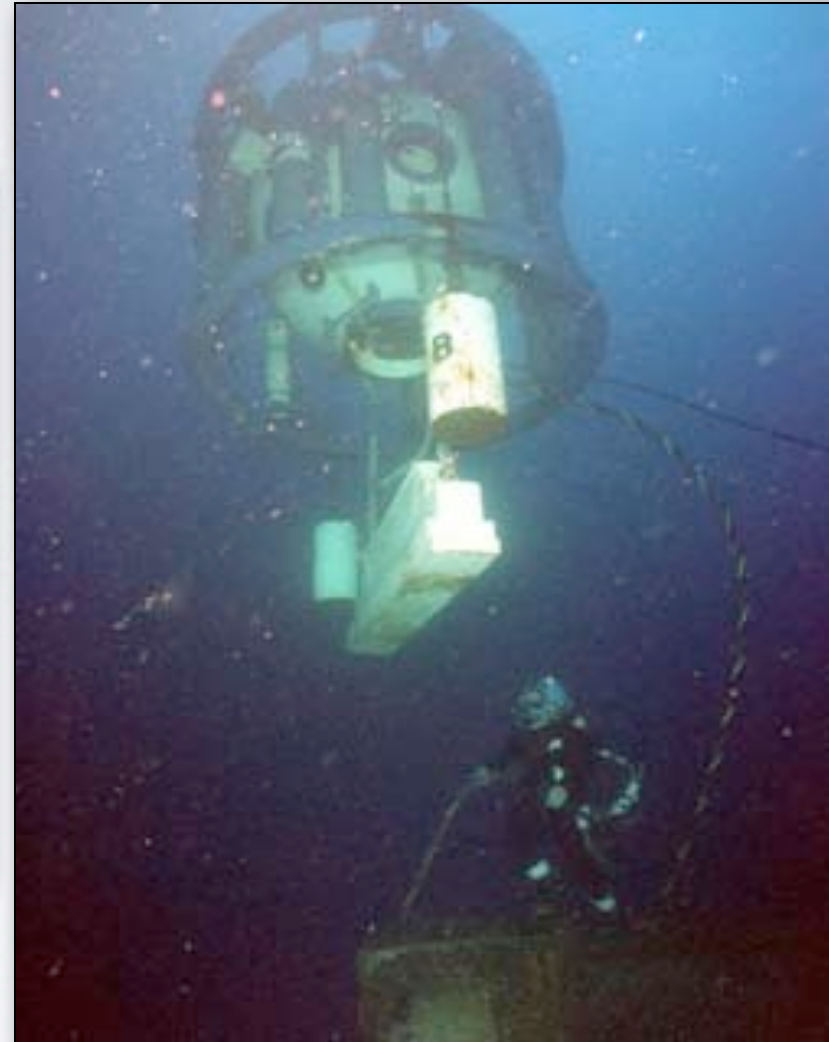


SATURATION DIVING



- Two man teams alternate time in water
- 4 + hours in water for each diver
- Travel between chamber and water is conducted in diving bell

SATURATION DIVING



ENGINE RECOVERY



ENGINE RECOVERY



ENGINE RECOVERY



ENGINE RECOVERY



ENGINE RECOVERY



QUESTIONS?

